ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE HEALTH AND SAFETY PLAN ACCIDENT PREVENTION SAFETY Manual No.: Section No. Page: RFP/ERM-94-00019 Table of Contents, R2

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PROGRAM PLAN INT. OPER. UNITS Organization: Environmental Restoration Mgmt

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE HEALTH AND SAFETY PLAN ACCIDENT PREVENTION SAFETY

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APPD

Appendix D Addendum to the Health & Safety Plan Accident Prevention Safety Program Plan (RFP/ER-TM1-93-OU9 2) Stage One Activities for OU9 Investigation of Tanks Outside Large Buildings

01/18/95

#### **DOCUMENT MODIFICATION REQUEST (DMR)**

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If modification is fo	or a new procedure or a revision, list concurring disciplines in Block 13 and enter N 13 then Concurror prints, and signs in Block 14 and distes in Block 15.	WA in Blocks 14 and 15 if modific	ation is for any type of change or a cancellatio	n organizations
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#### EG&G ROCKY FLATS PLANT Integrated Operable Units Health and Safety Plan

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**FINAL** 

## ADDENDUM TO THE HEALTH AND SAFETY PLAN

Accident Prevention Safety Program Plan

ROCKY FLATS PLANT Integrated Operable Units 8, 9, 10, 12, 13, & 14 Phase I RFI/RI

Stage One Activities for OU9: Investigation of Tanks Outside Large Buildings

U. S. Department of Energy Rocky Flats Plant Golden, Colorado

**ENVIRONMENTAL RESTORATION PROGRAM** 

November 1994

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### FINAL REVIEW AND APPROVAL OF THE PROJECT HEALTH AND SAFETY PLAN

The Project Health and Safety Plan (HASP) has been written for the use of personnel associated with the environmental restoration site/task project. All personnel will comply with all aspects of this plan as it relates to health, safety, and emergency response

Health and Safety Plan Title:

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Addendum to the Integrated Operable Unit Health and Safety Plan -Stage One Activities for OU9. Investigation of Tanks Outside Large Buildings

EG&G Project Manager	11/30/94 Date
MD Schreckinglest  Health and Safety Liasson Officer	11-30-94 Date
Kengo C.	11/30/94
Environmental Restoration Health and Safety Officer	Date
Jacobs Health and Safety	9-1-99 Date
Jupi Muya grokima for bha Brancerman Jacobs Project Manager	9-1-94 Date

#### EG&G ROCKY FLATS PLANT

Integrated Operable Units

Health and Safety Addendum OU9-Outside Tanks

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Health and Safety Addendum

**OU9-Outside Tanks** 

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This addendum has been designed to allow the continued use of the primary Integrated Operable Units Health and Safety Plan ("primary HASP"). Only task-specific hazards and controls are described in this addendum. To allow for efficient use of the addendum in conjunction with the primary HASP, chapter and table numbering remains consistent with the primary HASP. All items in the primary HASP remain in force unless specifically addressed in this addendum.

#### 3.6 PROJECT DESCRIPTION

Modified Table 3-1 presents tank-specific tasks to be performed under this HASP addendum.

#### 4.1 PERSONNEL TRAINING REQUIREMENTS

#### 4.1.1 Preassignment Training

In addition to the 40-hour basic health and safety training required under 29 CFR 1910.120, employees must complete the training listed in Table 4-1 that pertains to their job category and task performed.

#### 5.2 HAZARD EVALUATION

The hazard evaluation is based on the Hazard Release Report, historical data, the OU-9 Work Plan and interviews with process owners and process waste generators. Modified Table 5-2 presents a location and hazard summary by tank.

#### 5.4 PROJECT TASK ANALYSIS

The work to be conducted under this HASP addendum may not be in open areas, and there may be impediments to natural ventilation. All other assumptions and discussions presented in the primary IOU HASP apply to this addendum.

#### 5.4.1 Surficial Soil and 6-Inch Vertical Profile Sampling

(This section has no changes. The sections are repeated for the reader's convenience.)

Surficial soil samples will be obtained from the surface of the ground to a maximum depth of 6 inches. Some soil sample sites may require the removal and patching of asphalt and concrete. Given below are the steps required to perform the work, associated

# Summary of Activities OU9 Original Process Waste Lines MODIFIED TABLE 3-1

TANK NO.	TANK INSPECTION	HPGe/Nai SURVEY	RESIDUE OR WIPE (1)	VAULT WATER(2)	GROUND- WATER (3)	SURFACE SOIL	BOREHOLE/ SOIL SAMPLES
T-1		×			×		×
T-2, T-3	YES (T-3)	×	Х(Т-2) Х(Т-3)	χ(τ-2)	×	×	×
T-7		×			×		×
T-10	YES	×	×		×		×
T-11, T-30	YES	×	×		×	×	×
T-14, T-16	YES	×	X(T-14) X(T-16)		×		×
T-15, T-17		See T-14, T-16			See T-14, T-16	See T-14, T- 16	
T-21, T-22	YES	×	X(T-21) X(T-22)	x	×		×
T-27	NO	See T-21, T-22				×	
T-29	YES	×	×	x	×	×	×
T-40	YES	×	×	×	×		×

Z

(1) If no residue is present, a wape sample will be collected. Wipe samples will be analyzed only for qualantive rediclogated analyses (2) Sample collected only if water is encountered.

High purity Germanum Individual Hazardous Substance See 

Soderen lodide, conducted only if HPGs data indecate anomalies to be determined in the field based on HPGs results

TABLE 5-2 Location and Hazard Summary by Tank

OTHER RELATED HAZARDS AND COMMENTS	Known release area Overhead uffiles (sharm and mahuni gas), underground uffiles are server and rev valer. Area is need to door from Building 122, ground is level covered with sephali and concrete Possible high pedeatrion traffic area	Overhead utilities include steam, natural gas, and elactrical. Underground utilities include may water and process wade. Access for drill fig is limited. Vaults are currently locked and tagged out. Currently, approximately 100 gallons of water are in each wait. Ground surface is level and covered with gravel. Possible high pedeatrian traffic area.	Overhead stilling include sheam, natural gas, and electrical. Underground stilling include may waite. Access for diff of its finished. Will need to break piping on south side of sheal trenk to semple for residue. Ground surface is level and covered with grovel. Possible high pedession traffic area.	Overhead utilities to the east of Building 528 include steam and natural gas. Underground utilities include process wants, new water, domestic water, and communication cable. The east side of building is a steep grads. Or
RADIOLOGICAL HAZARDS	<b>£</b>	Yea, in soils and lant. Pu, Am, U, Cm.	Yes, in solit and tark. Pt., Am, U, On.	Yes, in soils and farit. Pu, Am, U
CONFINED SPACE ENTRY	<b>2</b>	2	2	Gee, If bank is sampled
CONTAMINANTS	Trace redionuclides, bleach, scepe, H <sub>2</sub> O <sub>2</sub> , and some organics	Natic Acid (HND <sub>3</sub> ), HF, hydroflouric acid (HF) suduric acid (HF) suduric acid (HF), societ acid (CHLO <sub>3</sub> ), hydrochloric acid (HCO <sub>3</sub> , societ acid (CHLO <sub>3</sub> ), perchitoric acid, ammonlum hydroidis (HHOO), NaCH, acidon, alcohole, cycloheama, taluena, sylena, trisoctomina, efter, Pu, Am, U, Cm, Be, ammonlum thiocyanale, advylane glycol, and PCBe	Ammonia was stored in aboveground steal tank. The underground concrete tank hald HMO, HE, H500, HOI, CH/Op, perchiotic acid (HC10.), HC10., NH/OH, NuCH acetons, alcohols, cycloherans, taleans, sylens, sylens, after Pri. Am, U, Cr, Be, ammonium thiocyanate, ethylene glycol, and PCBs	HND,, HF, H,8O <sub>4</sub> , HCl, chronic add NH,OH, NaOH, KOH, acatons, carbon tetrachloride, chloroform, 1,1,1-TCA (methyl chloroform), TCE, frem, Ps, An, U, Cu, Cr, PCBs, peeticides, and harbicides
VOLUME	600 gallon underground stairless cleaf tark	3,000 gatten underground corrects tank. Three corrects vaults are also secoclated with T-2	Aboveground 3200 gallon steel tenk and a 3,000 gallon underground concrete tenk.	Two-2000 gallon steed banks
ГОСАТІОМ	<b>2</b> c	Beneath and south of Building 441 Tank to in 1455 172	South of Building 441 Tank is in 1458 122	traids Building 528 tank vault southeast of Building 550 Taniss are in 1455 150
TANK		7.2	1-3 MP 1-123	1.7 RPP T-622, T-623

TABLE 5-2 Location and Hazard Summary by Tank

OTHER RELATED HAZARDS AND COMMENTS	Overhead utilities include natural gas, steam, decirical, acid and plenum. Underground utilities include process veste raw water, domestic value and sewer. Ground surface is lovel but drill rig access in limited. Full and 4°s required to enter the building. Area is high vehicle and pedeatrian traffic zone.		Tank marways are seeled locked and tagged eut. One way to sample bank is from basis to be RCA. Sample point may be from the tank drain line. No everhead utilities on east side of building Soil borings will be on level ground. Underground utilities include process waste. Area is high pedestrian and vehicle traffic.	Tank manways are seeled locked and lagged eat. The only way to sample tank is from bride Building 774 in an RCA. Sample point may be from the tank drain line. No everhead utilities on east side of building Sell berings will be on level ground. Underground utilities include process waste. Area is high pedeation and vehicle traffic.
RADIOLOGICAL HAZARDS	Yes, in soile and lank. Pu, Am, U, tribum.	¥	Yes, in solls and lank. Pu, Am, U	Yes, in solis and tank. Pts, Am, U
CONFINED 8PACE ENTRY	Yes, sampling lank residues	ź	Yea, if orday into bank	You, if orday late mark
CONTAMINANTS	CCI, TCA, TCE, bakena, Pu, Am, U, billum, Cd, Cr, and lubricating oils	CCL, TCA, TCE, chloroethane, freon, Pu, Am, U, Pb, Be, Ta, Ca, LJ, calclum, fluoride, lithium chloride, mechine oils, lubri- caling oils, lathe coolent, and ethylene glytool	HNOs, H-SOs, HF, NaOH, KOH, small amounts of various solvents. Pu, Am, U, Fs, Cr, Hg, M, Ts, chlorides, olls, and greese Tank has been flushed with water	HNO, H,SO, HF, NaOH, KOH, small amounts of various solvents. Pu, Am, U, Fe, Cr, Hg, Ni, Ts, chterides, olls, and greese Tanks has been flushed with water
VOLUME	Two-4500 gailon concrete underground tents	Twe-2000 gallon concrete lanks and one-23,111 gallon vauit	30,000 gallon concrete underground tank	Twe-14000 gallon controls underground tentos
LOCATION	\$ E	heide Budding 731 lank valid east of Budding 707	East of Building 774 in 1455 124	T-16 East of Building 774 NFP T-86 and T-6 in IHSS 124 and 125
TANK		T-11/T-30	7-14 NGTP 7-08	7-16 NGP T-86 and T-6

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TABLE 5-2 Location and Hazard Summary by Tank

TANK	LOCATION	VOLUME	CONTAMINANTS	CONFINED SPACE ENTRY	RADIOLOGICAL HAZARDS	OTHER RELATED HAZARDS AND COMMENTS
121	hreide Building 626 lank vault weet of Building 686 in HSS 164.2	135-gaillen concrete floor eump	Scepe, cleaning Ruids, U-235, nitrates, and Pu	erppes dure Bugdues 'es,	Yes, in soft and tank walk. For and U-235 Posmissly finalis	No overhead utilities in hymodiate area Driff of access is sufficient, must clear socially zone. Undergraund utilities include process weeks, sower and learnidation drains. Vault salucture is one unit. Access to vault is by manney or litting of concrete states that cover the wauft. Water is present in the vault in the spiring from infiltuation of groundwater and prediplation. Ground surface is level covered with gravel. Presible vehicle and pedestrian traffic in area. Ruitleansies have been forcem to be in vault.
7-22 NGP T-440 and T-448	hreide Building 626 lank vault weet of Building 686 in HSS 164.2	2-450 gailon 55T and 1-100 gailon 55T	One of the 450 gallon tanks was used to alone washe from noons 101 and 103 in Building 869. This weeks consisted of U and Pu. The other 450 gallon tank stored fleath unanium used for experiments after midding. The 100 gallon tank stored philonium used for experiments after midding.	Yes, sampling tank residus	Yes, in solts and tank Pu and U-235 Puterstady Basto	the overhead utilities in immediate area Drift of access is OK, must chest security zone. Underground utilities brickude process waste, sever and foundation drains. Vault structure is one unit. Access to vault is by manuary or litting off concrete states that cover the vault. Water is present in the your fine spring from inflittedon of groundwater and precipitation. Ground auritice is level covered with gravel. Presettie vehicle and precipitation traffic in area.
1-27	North of Building 628 on concrete stab. Tank has been removed	500 gallon portable liquid dempeter	Weste from rooms 101 and 103 in Building 866 Possible U and Pu.	¥	Yes, in solu Pu and U-235	No evertrand utilities in immediate area. Orill rig access is OK, must charr security zens. Undergreund utilities include process wards, sewer and foundation drains

TANK				CONFINED	RADIOLOGICAL.	OTHER RELATED HAZARDS
NUMBER	LOCATION	VOLUME	CONTAMINANTS	SPACE ENTRY	HAZARDS	AND COMMENTS
T-20 NGP T-207	South of Building 774 and east of Building 703	200,000 gallon above ground shed lank	HNO <sub>2</sub> , HF, H <sub>2</sub> SO <sub>4</sub> , HCI, C <sub>2</sub> H <sub>2</sub> O <sub>5</sub> , H <sub>2</sub> PO <sub>4</sub> , H <sub>2</sub> CO <sub>4</sub> , HCID <sub>4</sub> , opanic, NH <sub>2</sub> CO <sub>4</sub> , NaCH, HCO <sub>4</sub> , opanic, NH <sub>2</sub> CO <sub>4</sub> , NaCH, KOH, CacOH, MgCH, acatoma, archanist, optiatearna, taluama, archanist, optiatearna, otherstorm, chlorosthana, bin-actyl phosphina each, Pu, Am, U, Cm, Sa, As, Au, Cr, Ta, NI, Cd, Pt, Pa, Ti, Zh, Ou, Sn, W, Fa, Hg, U, Ca, Ca, Mn, Mg, Ma, ammonium biocyamata, ethytene gipcot, PCBs, fluorita, Markaniing ell, No. 2 and No. 8 had oil and isarceana	Possibly when sampling Yes, in solls and lank lank residue Pu, Am, U, Cm		No overhead utilities. Underground utilities are process weath. A beathve additionable around the notitions side of T-29 Access to T-29 is throughtine top of the tank or a manuary on the west side of the tank. Manuary is these fact from ground surface. Tank is nest to cooling tower, noise level is moderate. Avea is high vehicle and pedeatrian itselfic zone.
7	West of Building 809	2-400 gallon concrete underground tents	H <sub>6</sub> SO <sub>4,</sub> paint solvents, U-236, Pb., Be, detergents, ecop and greace	Yes, sampling lank residue	Yes, U-236 in tank and possible surround soil	No overhead utilities. Underground utilities include process wasts. Door to tento be waited shut. Some documentation exists on decontamination of tento when abandoned. Presible padestrian truffic.
NOTES.						
Am - emericken		YF = hydrofluoric acid	7	Pb - lead		
Do - Deryfflern		Hg a marcury		PCS = polychlorinated bipheryl	themy	
Co = carctum CCM = carton tatrachlorida	rachiorida	HZO2 = hydrogen percekte HS3 = indi-khael herzenhass suh-	readdo medeta subatanza alla	Pu - phatonium To :: Installed		
Cd = cadmium		KOH = potentium frychodde	drodde	TCA - trichitonethane		
Cr = chromhun		L - Milen		TCE = trichloroethers		
Cu = copper		NaCH = sodium hydroide	rodde	U = umfum		
Fo = from		X . steled		1,1,1-TCA=1,1,1-trichtoroethene	outhern	

EG&G ROCKY FLATS PLANT

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potential hazards, and hazard control measures. Concrete and asphalt removal is addressed in Section 5.4.2. Table 5-3 summarizes the hazards and controls for these activities.

#### 5.4.2 Asphalt and Concrete Removal and Sampling

(This section has no changes. The sections are repeated for the reader's convenience.)

Asphalt and concrete will be removed to collect surficial soil samples in areas covered by asphalt and concrete as well as to sample the asphalt and concrete itself. The size of the pieces to be removed may vary from a 4- to 6-inch diameter coring to a 30- by 30-inch area that may be sawed. Table 5-4 summarizes the hazards and controls for these activities.

#### 5.4.6 Tank Inspections

Tanks will be inspected to visually identify structural failures where past releases or potential releases to the environment have occurred. The inspections will be conducted in accordance with SOP FO.28, Tank and Pipeline Investigations for RFI/RIs. Tank inspections will be conducted from manhole openings, where permissible, to avoid entry into the tanks. Where necessary to open tanks, appropriate lockout/tagout will be ensured first. Table 5-9 presents the steps required to perform the work, associated potential hazards, and hazard control measures.

This task is particularly hazardous when tanks contain acutely toxic materials or require confined space entry for inspection. These tanks possibly include 10, 21, 22, 29 and 40.

#### 5.4.7 Surface Radiation Survey

Surface radiation surveys will be conducted to assess radioactive contamination of surficial materials. Radiological survey techniques for surface soils will include high purity germanium (HPGe) surveys supplemented with sodium iodide (NaI) surveys. The NaI survey will consist of performing a 4-foot-grid survey with NaI detector to delineate specific anomalies detected by the HPGe survey on the ground around the tank. Table 5-10 summarizes the steps, hazards, and controls for these activities.

TABLE 5-3
Surface and 6-inch Vertical Profile Soil Sampling

Step	Hazard	Controls
Layout of sample plots	Ambient levels of suspect contaminants	Prescreening of sample area for radionuclides and nonradioactive contaminants and use of real-time monitoring.
	Slips, trips, and falls (all tasks)	Employees will wear footwear appropriate for existing conditions and avoid areas where falls are probable.
	Manual material handling (all tasks)	Employees will follow material handling requirements given in Section 5 5.5.
	Cuts, scrapes, and contusions to hands (all tasks)	Employees will wear leather gloves when performing work that may result in cuts, scrapes, and contusions
Removal of over-burden and collection of samples	Ambient levels of suspect contaminants (all tasks)	Personal and real-time monitoring for dusts and organics
	Contact with contaminants Generation of airborne dusts	Use of mist from spray bottles or orchard sprayers to control dust
		Personnel shall wear PPE as specified for each IHSS in Section 8.0
Containerization of sample	Contact with sample	Personnel shall wear PPE as specified for each IHSS in Section 8 0
Decontamination of equipment	Splashing of decontamination solutions	Personnel shall wear safety glasses with side shields in addition to PPE specified in Section 8 0
		Personnel coming into contact with contaminated wastes shall immediately go through decontamination

Notes PPE = Personal Protective Equipment

TABLE 5-4
Asphalt and Concrete Removal and Sampling

Step	Hezerd	Controls
Set up of asphalt and concrete saw or coring machine	Ambient levels of radioactive and nonradioactive contamination (all tasks)	Prescreening for contaminants (radioactive and nonradioactive)
	Manual material handling (all tasks)	Personnel shall follow material handling requirements given in Section 5.5.5.
	Cuts, scrapes, and contusions (all tasks)	Personnel shall wear leather work gloves while performing work.
Cutting/coring of asphalt or concrete	Generation of airborne dusts	Personnel shall use personal protective equipment as outlined in Section 8.
		Misting shall be used to control dust.
	Contact with moving parts	All moving parts shall be guarded as recommended by the equipment manufacturer
	Overexposure to contaminants (all tasks)	Real-time and personal sampling shall be used as outlined in Appendix A.
	Cuts, scrapes, and contusions (all tasks)	Personnel shall wear leather work gloves while performing work
	Cuts, scrapes, and contusions (all tasks)	Personnel shall wear leather work gloves while performing work
Removal of asphalt or concrete	Manual material handling	Personnel shall follow the material handling requirements given in Section 5.5.5
	Overexposure to contaminants	Real-time and personal sampling shall be used as outlined in Appendix A
Patching of hole	Contact with patching material	Follow precautions given in material safety data sheets for patching product.
	Impact with flying chips or particles	Employees shall wear face shield and leather gloves in addition to PPE specified in Section 8
	Overexposure to contaminants	Real-time and personal sampling shall be used as outlined in Appendix A

TABLE 5-9
Tank Pipeline Inspections

STEP	HAZARDS	CONTROLS
Visual Inspection	Slips, trips, and falls	Personnel shall follow procedures in Section 5.5.6.2. Personnel working at heights will comply with EG&G Health & Safety Practices Manual 22.05.
	Confined space entry	Personnel will follow procedures in Section 5.5.12.
		Lock-out/tag-out procedures will be followed by personnel in Section 5.5.13.
	Illumination	Illumination requirements in Section 5.5.16.
	Bees	Personnel will follow requirements in Section 5.6.2.1.
	Contact with contamination on interior of tank.	Personnel will wear PPE per Appendix A and RWP.

#### Notes:

PPE = Personal Protective Equipment RWP = Radiological Work Permits

TABLE 5-10 Surface Radiation Survey

STEP	HAZARDS	CONTROLS
Layout of survey grids and stations	Slips, trips, and falls	Personnel wil follow procedures in Section 5.5.6.2.
	Contact with contaminants	Radiological monitoring per Radiological Work Permits Personal Protective Equipment per Appendix A.
	Heat/cold stress	Heat/cold stress procedures in Section 5.5.9.

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**OU9-Outside Tanks** 

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#### 5.4.8 Residue and Wipe Samples

To help characterize Original Process Waste Line (OPWL) wastes, residue samples will be collected from each abandoned tank that has not been cleaned since its removal from process waste service. In instances where no residue is present, one wipe sample will be taken from the interior surface of the tank (preferably at the base of the tank or near pipeline connections). Where possible, residue or wipe samples will be collected remotely to mitigate the need for entry into confined spaces. Pipes will be accessed through valves or by unbolting connections. No pipe cutting is planned.

Table 5-11 summarizes the steps, hazards, and controls for these activities.

This task is particularly hazardous when tanks contain acutely toxic materials or require confined space entry for sampling. These tanks possibly include 2, 3, 10, 21, 22, 29 and 40.

#### 5.4.9 Vault Water/Groundwater Sampling

Sampling of incidental surface water or groundwater will be conducted to characterize potential contamination of valve vaults that are associated with OPWL tanks. Table 5-12 summarizes the steps, hazards, and controls for these activities.

#### 5.4.10 Soil Boreholes

Boreholes will be drilled and sampled to identify areas of contamination adjacent to a tank location. Areas beneath or near external connections and openings and near joints or corners around underground tanks will be targeted as primary borehole locations. As a general rule, boreholes will be drilled on each accessible side of the tank or vault, as close as possible to the tank or vault. For locations where the tanks were removed, a single borehole will be drilled as close as possible to the center of the original tank location. Soil samples will be collected from each borehole. Table 5-13 summarizes the steps, hazards, and controls for these activities.

#### 5.4.11 Groundwater Sampling

Groundwater sampling using a HydroPunch sampler or equivalent in soil boreholes drilled into the saturated zone will be conducted to characterize potential contamination of the groundwater. Table 5-14 summarizes the steps, hazards, and controls for these activities.

TABLE 5-11 Residue and Wipe Samples

STEP	HAZARDS	CONTROLS
Access tank/pipe interior	Slips, trips, and falls	Personnel will follow procedures in Section 5.5.6.2.
	Confined space entry	Confined space entry procedures in Section 5.5.12.
		Lock-out/tag-out procedures in Section 5.5.13.
Sample collection	Exposure to contaminated air	Monitoring per Section 6 and Appendix A
	Heat and cold stress	Temperature stress procedures per Section 5.5.9.
	Illumination	Illumination procedures in Section 5.5.16.
	Additional hazards contained in Step 1	Additional controls contained in Step 1
	Contact with potentially contaminated residues or air	Personnel will use PPE and perform monitoring per Appendix A and RWP.
	Snake bites	Personnel will wear knee- high boots in vaults where snakes have been identified as a hazard. Personnel will ensure adequate illumination before accessing any area and will use a probe to determine if snakes are in an area before reaching or stepping into an area. If rattlesnakes are detected in an area requiring access, personnel will evacuate the area. See Section 5.6.3.
Equipment decontamination	Contact with potentially contaminated rinse water	Personnel will use PPE as required in Section 9.0.

TABLE 5-12 Vault Water Sampling

STEP	HAZARDS	CONTROLS
Access vault interior	Slips, trips, and falls	Personnel will follow procedures in Section 5.5.6.2.
	Confined space entry	Confined space entry procedures in Section 5.5.12.
		Lock-out/tag-out procedures in Section 5.5.13.
	Radiological and chemical exposure	Personnel monitoring per Section 6 and Appendix A. Personnel will use PPE as required in Appendix A and RWP.
Sample collection	Radiological and chemical exposure	Personnel monitoring per Section 6 and Appendix A. Personnel will use PPE as required in Appendix A and RWP.
	Illumination	Illumination procedures in Section 5.5.16.
	Additional hazards contained in Step 1	Additional controls contained in Step 1.
	Heat and cold stress	Temperature stress procedures per Section 5.5.9.
Equipment decontamination	Contact with potentially contaminated rinse water	Personnel will use PPE as required in Section 9.0.

TABLE 5-13
Soil Boreholes

STEP	HAZARDS	CONTROLS
Lay-out of survey grids and stations	Slips, trips, and falls	Personnel will follow procedures in Section 5.5.6.2.
	Contact with contaminants	Radiological monitoring per Radiological Work Permits (RWP).
Sample collection	Exposure to contaminated air	Monitoring per Section 6 Appendix A and RWP.
	Mechanical & hydraulic hazards	Heavy equipment procedures contained in Section 5.5.1.
	Heat & cold stress	Temperature stress procedures per Section 5.5.9.
	Underground utilities	Utility clearance will be performed per Section 5.5.3.
	Aboveground utilities	Comply with procedures in Section 5.5.2.
	Manual material handling	Lifting practices per Section 5.5.5.
	Additional hazards contained in Step 1	Additional controls contained in Step 1
Soil borehole sampling	Contact with potentially contaminated soils	Personnel will use PPE as required by Appendix A and RWP.
Equipment decontamination	Contact with potentially contaminated rinse water	Personnel will use PPE as required by Section 9.0.

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TABLE 5-14 Groundwater Sampling

STEP	HAZARDS	CONTROLS
(1) Lay-out of survey grids and stations	Hazards same as soil boreholes. Refer to Table 5-13.	Controls same as soil boreholes. Refer to Table 5-13.
(2) Sample collection	Hazards same as soil boreholes. Refer to Table 5-13.	Controls same as soil boreholes. Refer to Table 5-13.
(3) Groundwater sampling	Contact with potentially contaminated groundwater.	Personnel will use personal protective equipment as required by Appendix A.
(4) Equipment decontamination	Contact with potentially contaminated rinse water.	Personnel will use PPE as required by Section 9.0.

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#### 5.5.12 Confined Space Entry

Tasks performed under this HASP addendum may include confined space entries for tank inspections or for residue sampling. The Project Task Analysis reviews tasks and hazard controls for confined space entries. Table 5-2 identifies tanks that are likely to involve confined space entries. All confined space entries will be performed according to the Rocky Flats Health & Safety Practices Manual 6.04 and the Jacobs Engineering's procedure for confined space entry (Appendix D in Primary HASP).

#### 5.5.16 Illumination

Where tank inspections require additional illumination, the light source will be intrinsically safe.

#### 6.5 NOISE

The main sources of noise for the tasks performed under this HASP addendum are drilling rigs. Sound-level monitoring equipment will be used during operations to determine representative noise levels. The personal exposure limit for noise is 85 decibels on the A-weighted scale (dBA). Hearing protection will be used when noise levels are greater than 85 dBA. Employees will participate in the Jacobs Hearing Conservation program defined in the Jacobs Hearing Protection Conservation Policy (Appendix B in Primary HASP).

#### 8.1 LEVELS OF PROTECTION

#### **8.1.1 Personal Protective Equipment**

Base levels of protection for activities covered by this HASP addendum may be level D, modified level D, level C, or level B. Specific protective equipment for each task at each tank is described in Appendix A and the Radiological Work Permits in Attachment One.

#### APPENDIX A

Appendix A describes Personal Protective Equipment and monitoring requirements for non-radioactive chemicals associated with specific tasks. The Radiation Work Permits in Attachment One list personal protective equipment and monitoring requirement for radiological hazards.

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n	IHSS	TANK	LOCATION
		1:1	South side of Building 122

Suspect Contaminants:

MO	NITORING R	MONITORING REQUIREMENTS		A	ACTION LEVELS	S	
Conteminant	ᇤ	Instrument	Range	Level C	Level B	Evacuate & Resvatuste	Notes
Unknown VOC's		PIO	0-2,000 ppm	6-20 ppm		>20 ppm	Monitor in BZ during Borehole & Groundwater Sampling.
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1	Use tubes if PID reads > background sustained.

Personal Monitoring:

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	Sta	Start Level of	f Protection	lon	Specific	PPE To Use,	When Re	equired By Le	Specific PPE To Use, When Required By Level Of Protection
Type of Work	Level D	Level D Level D Modffled	Level C	Lavel B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Burleos Redistion Burvey	×								
Borehole Samples		×			ritrile	Tyvek	GMC-H	GMC-H hearing pre.	
Groundwater Samples		×			nitrile	Tyvek	GMC-H		

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Suspect Contaminants:

NOM	NITORING R	MONITORING REQUIREMENTS		AC	ACTION LEVELS	S	
Conteminent	PEL	Instrument	Range	Level C	Level B	Level B Evacuate & Reevaluate	Notes
\$,200		PID	0-2,000 ppm	5-20 ppm	> 20' ppm'	>20 ppm²	>20 ppm <sup>2</sup> During residue sampling. <sup>2</sup> During all other activities.
Inorganic acids		Detector Tube	1-80 ppm			15 ppm	Take tube reading upon opening tank for qualitative records
Possible metals		MiE miniram	0.1-100 mg/m³	1.5-5 mg/m³		≥5 mg/m³	≥5 mg/m³ Use during soil boring

rsonal Monitoring:

GISCHEL MOINTOINS		
Conteminant	ANALYTICAL METHOD	NOTES
Inorganic acids	MOSH 7903	During residue sampling, if acid tube > background and exposure time ≥ 1.5 hrs
Metals	NOSH 7300	Sample if miniram level C action levels reached.

Personal Protective Equipment:	ПÇ								
	Star	Start Level o	f Protection	Jon	Specific	PPE To Use,	When Re	equired By Le	Specific PPE To Use, When Required By Level Of Protection
Type of Work	Level D	Level D Level D Modified	Lavel C Lavel B	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Burface Radiation Burvey	×								
Surface Soll Sampling	×				silver shield				
Residue/Wise Semoling			×		eliver shield	Serenex	GMC-H		
Vault Weter Berroffin			×		eliver shield	Serenex	GMC-H		
Borehole Samples		X			eliver shield	Tyvek	GMC-H	GMC-H hearing pre.	
Groundwater Samples		×			eliver shield	Tyvek	GMC-H		

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LOCATION	South of B441
TANK	Т-3
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		1			Notes				25 ma/m² Use denim enil bosina
COCATION	441			S	Evecuete &	Koevatuate			≥5 mo/m³
2	South of B441			ACTION LEVELS	Level B		250	mdd Oca	
	T-3			AC.	Level C		12 nom	- MM	1 5-5 mg/m³
	122				Range		0-2.000 nnm		0 1-100 mg/m³ 1
	6		QUIREMENTS		Instrument		5		MIE miniram
		3:	MONITORING REQUIREMEN		PEL		Z5 ppm		
		uspect Contaminants:	MO			America	Ammores	Possible mossic	

Personal Monitoring:

NOTES	If PID level C action levels reached and noteonial evocute since are	Sample if minram level C action levels reached
ANALYTICAL METHOD	MOSH 1 (205)	NIOSH 7300
Contaminant	Ammonia	Metals

	Sta	Start Level of	f Protection	tion	Specific	PPE To Use,	When Re	dufred 8v 1s	Specific PPE To Use, When Required By Layer Of Protection
Type of Work	Lavel D	PeliboMi Deval	Lavel C Lavel B	Loved B	Outer Glove Type	Clothing Type	Respirator Cartidge Type	Other	Notes
Surface Radiation Survey	×								
Tent/Pipeline Inspection (Exterior)	×				and and				
Surface Soll Samofina	^						H-QWD-H		
	Ţ				nitrile		GMD-H		
Meridue/TVTee Camping			×		nitrile		GMD-H		
Borehole Samples		×			ritrile	Tovak	1		
Groundwater Samples		×			ritrile		GMC-H	ord Business	

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Suspect Contaminants:

2	IONITORIN	MONITORING REQUIREMENTS		ACI	ACTION LEVELS	SI	
Contaminant	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOCs		PID	0-2,000 ppm	5-20 ppm		> 20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1 ppm	Use tubes if PID reads > background, sustained
Chloraform	2 ppm	Detector Tube Draeger	2-10 ppm			>2 ppm	Use tubes if PID reads > background, sustained
Possible metals		MIE moram	0 1-100 mg/m³   1 5-5 mg/m³	1 5-5 mg/m³		≥5 mg/m³	≥ 5 mg/m³ Use during soil boring

Personal Monitoring:

Conterminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	OSH1003	Sample if level C action levels reached
Metals	NISOH7300	Sample if level C action levels reached

Start Level o	Sta	Start Level of	f Protection	tion	Specific	ecific PPE To Use, When Required By Level Of Prot	When Re	aguired By Le	Specific PPE To Use, When Required By Level Of Protection
Type of Work	Level D L	Lavel D Lavel D Modified	Lavel C Lavel B	Lavel B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Å	×							44	
Borehole Samples		×			silver shelds	Tyvek	GMC-H	GMC-H hearing pro.	
Groundwater Samples		×			silver shields	Tyvek	GMC-H		

Site Location and Description:

LOCATION	B730
TANK	T-10
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Suspect Contaminants:

₩.	NITORING R	MONITORING REQUIREMENTS			ACTION LEVEL 6		
	Ş				CION CEVE	9	
	7	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOCs	>50 ppm	OIA	0-2,000 ppm	25		250	
(TCA, TCE, Toluene)							
Cartes Tates	•						
Carbon letrachionde	Z ppm	Detector Tube Sensidyne	1-60 ppm		> 1 ppm	> 1 ppm²	Use tubes if PID > background
						-	sustained
							During inspection or residue
							sampling During all other activities
Oxygen Deficiency	<195%	O. monitor	0-100%		20.00		
			222		800 PT V		Use during confined space entry
Possible metals		MIE miniram	0 1-100 mg/m³	1-5 mg/m³		>5 mo/m3	>5 mo/m3 like dumps and house
						- C	

Personal Monitoring:

MOTES		ring confined space entry for inspection or residue samp	ole if miniram level C action levels reached
ANALYTICAL METHOD	4	3	NIOSH 7300 Sam
Contemhant	Halogentated Hydrocarbone MOSU 1002		Metals

	Star	Start Level of	f Protection	tion	Specific	PPE To Usa	When B.	andred By 1	Specific PPE To Use When Required by Land Of Bush of
								ACHION DY LA	Men OI Protection
Type of Work	Level D	Level D Modified	Level C	Level C Level B	Outer	Clothing	Respirator	Other	Notes
					Туре		- Ak		
Conference De Marchan Commerce	,								
Tax to the manual services	Ý								
Tank/Pipeline inspection (Interior)				×	- Product				
					OHIT N	Stanex	GMCH	herness & line	GMC-H herness & line   Confined space entry
Residue/Whe Sampling				×	rutrile	Seranax	פאני ה		
Borehole Samples		×			7				Herings a line Contined space entry
						1 WOK	GMC-K	hearing pro	
Woundwater Samples		×			rutrie	Twek	GMC-H		

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	TANK	T-11, T-30
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Suspect Contaminants:

Ž.	ONLORING	MONITORING REQUIREMENTS		¥	ACTION LEVELS	<i>u</i> .	
Conteminant	PEL	Instrument	Range	Level C	Level B	Evacuate &	Notes
voc's	> 50 pom	PID	0-2.000 ppm	5.20 nom		200	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1 ppm	Use tubes if PID reads > background
					•	•	

Personal Monitoring:

	NOTES		Tiple if level C action levels reached.
ANA INCIDENTAL AND INCIDENTAL	AMALTIKAL METHOD	MINSH 1003	2001 1000
Contembore		Halopentated Hydrocarbons	

	Start	Start Level of	f Protec	tion	Specific	PPE To Use,	When Re	ouired By Le	Specific PPE To Use, When Required By Level Of Protection
Type of Work	Lavel D Lavel D Modified	Modfiled	Lovel C Lovel B	Level B	Outer Glove Type	Clothing	Respirator Curvidge Type	Other	Notes
Residus/Mps Bampling		×			ritrile	Serenex	BMCH		Serenex required If
									Gourne Contention

Site Location and Description:

00	IHSS	TANK	LOCATION
6	124	T-14, T-16	East of 8774

Suspect Contaminants:

MOI	NITORING RI	MONITORING REQUIREMENTS		A(	ACTION LEVELS	S	
Contaminant	PEL	Instrument	Range	Level C	Level B	Evecuete & Reevaluate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm		>20 ppm	
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			>1 ppm	Use tubes if PID reads > background sustained.
Possible Metals		MIE miniram	0.1-100 mg/m³   1-5 mg/m³	1-5 mg/m³		≥5 mg/m³	≥5 mg/m³ Use during soil borings.

Personal Monitoring:

	والمارية وال	
Conterminant	ANALYTICAL METHOD	NOTES
Halopenated Hydrocarbons	MOSH 1003	Sample if applicable level C or B action levels reached
Metals	MOSH 7300	Sample if minitam level C action levels reached.

	Star	Start Level o	f Protection	tlon	Specific	PPE To Use,	When Re	equired By Le	Specific PPE To Use, When Required By Level Of Protection
Type of Work	Level D	Level D Level D Modified	Level C	Level B	Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Redisdon Survey	×				ritrile	Tyvek	GMC-H		
Tank/Pipeline inspection (interior)	×				nitrile	Tyvek	GMC-H		
Residue/Wipe Sampling	×				nitrile	Tyvek	GMC-H		
Borehole Semples		×			ritrile	Tyvek	GMC-H	hearing pro	
Groundwater Samples		×			nitrile	Tyvek	GMC-H		

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B828 vault, West of B886	T-21, T-22	164 2	6
LOCATION		IHSS	00

Suspect Contaminants:

MO	NITORING R	MONITORING REQUIREMENTS		Y	ACTION LEVELS	S	
	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		ON	0-2,000 ppm	5-20 ppm			
Carbon Tetrachloride	2 ppm	Detector Tube	1-60 ppm			> 1 ppm	Use tubes if PID reads > background sustained.
Oxygen deficiency	19 5%	0, montor	1-100%		≤195%		Comply w/ RWP

Personal Monitoring:

Contaminant ANALYTICAL METHO		D NOTES
Halogenated Hydrocarbons	MOSH 1003	If level C, action levels are reached (on PID or detector tube)

Type of Work Level D Modfled	Lavel C	Level B					
			Outer Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Rediction Survey							
	comply w/RWP						
	comply w/RWP						Knee-high boots for possible
Vault Water Sampling comply	comply w/RWP						rettlesnekes, entering vault use illumination & probe
Borehole Semples comply	comply w/RWP					Hearing pro.	
Groundwater Samples comply	comply w/RWP						

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IHSS TANK LOCATION	T-27 North of B828
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Suspect Contaminants:

MO	NITORING R	MONITORING REQUIREMENTS		,	ACTION LEVELS	S	
Contaminant		Instrument	Range	Level C	Level B	Evacuate & Resvatuate	Notes
VOC's		PID	0-2,000 ppm	5-20 ppm		> 20 ppm	
Carbon Tetrachloride	2 ppm	Detector tubes	1-60 ppm			>1 ppm	Use tubes if PID reads > background sustained.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	MOTES
Halopenated Hydrocarbons	NOSH 1003	If level C action levels are exceeded.

		Start Level of	Frotection 1	ion	1	PPE To Use,	When Re	To Use, When Required By Level O	Specific PPE To Use, When Required By Level Of Protection
Type of Work	Level D Level D Modfiled	Level D Modfiled	Lavel C Lavel B	Level B	Outer Glove Type	Clothing Type	Respirator Cartifique Type	Other	Notes
Burlace Radiation Burvey	×								
Surface Solf	×				Nitries.	Serenex	GMC-H		

Site Location and Tription.

LOCATION	South of B774,	East of B703
NV.	1-29	
IHSS		
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Suspect Contaminants:

	AONITORING R	MONITORING REQUIREMENTS					
Contembors	ě			ı	ACTION LEVELS		
	100	mstrament	Range	Level C	Level B	Evacuate &	Notes
voc's		OIA	0-2,000 ppm		>5 ppm³	>5 ppm²	<sup>1</sup> During interior inspection or
Carbon Tetrachloride	2 ppm	Detector Tubes	1-60 nom			$\top$	residue sembling.
Chloroform	2 ppm	Detector Tubes	2-10 ppm		> 1 pom'	> 1 nom 2	During all other activities. Use tubes if PID > heckmond
Hydrogen Cyanide	4.7 ppm(ST)	Detector Tubes			>2 nom		Sustained.
Inorganic Acids		Decrector Tubes	1-80 nam				opening tank,
Oxygen Deficiency	<19.5%	02 detector			70000	2	
Possible Metals		MIE miniram	0 1-100 mg/m³ 1 5-5 mg/m³	1 5-5 mg/m³	20.014	>5 ma/m³	>5 mofm <sup>3</sup> Hea during and bosing

Personal Monitoring:

Conteminent	ANALYTICAL METHOD	MOTES
Inorganic acids	MOSH 7903	Sample during residue sampling if acid take > hardware.
Halogenated Hydrocarbons	NIOSH 1003	Sample during residue sampling if PID Level 8 action level reached and exposure sime > 1.5 hrs.
Metals	MIOSH 7300	Sample if miniram level C action levels reached.

Triment to the state of the sta	Stai	Start Level of	f Protection	rog For	Specific	PPE To Hee	When B.	Section 19.	Specific PPE To lies When Bendard B.
Type of Work	Losse D	Level D Modified	Lavel C	Level B	Outer Glove Type	Clothing	Constant	other O	Notes
Surface Rediction Survey	×								
					Fithe				
Tenk/Pretine inspection (interior)				×	eliver chiefd	aliver shield Level B - Serence	7		
Tent.(Pleeline Inspection (Exterior)	×				affine and			an bro.	Possole work at heights
Storton Sall Samulles	,								
	×				aliver shield	Serenex	GMC-H	herness & line	GMC-H harness & line hoselite most at height
Residus/Wipe Sempling				×	eliver shield	aliver shield I and R . Secure	7 4 5		STATE OF THE STATE
Vault Water Sampling		×			1		CIMC-I		
					Dienti inne	1XMK	GMC-H	heering pro	
Borehole/Groundwater Samples		×			Billyer shield	Tyrek	GMC-F		

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	LOCATION		West to B889	
	TANK		T-40	
	HSS	The state of the s		
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Suspect Contaminants:

MO	NITORING R	MONITORING REQUIREMENTS		AC	ACTION LEVELS	60	
Conteminent	PEL	Instrument	Range	Level C	Level B	Evacuate & Reevaluate	Notes
VOC's		OH	0-2,000 ppm	5-20 ppm	>20 ppm¹	> 20 ppm²	>20 ppm <sup>1</sup> >20 ppm <sup>2</sup> During interior inspection and residue sampling.
Carbon Tetrachloride	2 pom	Detector Tube	1-60 ppm		>1 pom¹	>1 ppm	> 1 ppm <sup>1</sup> > 1 ppm   <sup>2</sup> During all other activities,
Suffuric Acid	1 mg/m³	Detector Tube	1-5 mg/m³			5 mg/m²	Messure sulfuric acid upon opening tank,
Oxygen Deficiency	<19.5%	<19.5% O2 monitor			<19.5%		Messure O. prior to and during entry.
Possible metals		MIE miniram	0.1-100 mg/m³ 1 5-5 mg/m³	1 5-5 mg/m³		≥5 mg/m³	≥ 5 mg/m² Use during soil borings.

Personal Monitoring:

Contaminant	ANALYTICAL METHOD	NOTES
Halogenated Hydrocarbons	MOSH 1003	Sample during residue sampling,
Metals	NOSH 7300	Sample if miniram level C action levels reached.

		Start Level o	f Protection	fon	Specific	PPE To Use,	When Re	quired By Lo	Specific PPE To Use, When Required By Level Of Protection
Type of Work		Level D Level D Modfled	Lavel C Lavel B	Loved B	Orber Glove Type	Clothing Type	Respirator Cartridge Type	Other	Notes
Surface Rediedon Survey	×								
Tank/Photine inspection (interior)			×		ritrile	Serenex	GMC-H	herness & line	GMC-H harness & line confined space entry.
Residue/Who Sampling			×		- utitle	Serenex	GMCH	herness & Ens	GMC-H hames & fine confined space entry.
Vault Weber Bampiling	×								Serenex if veuit entry required. Serenex required if clothing contamination Blady,
Borehole Semples		×			nitrile	Twek	GMC-H	hearing pro.	
Groundwater Samples		×			eitrile	Tyvek	GMC-H		

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#### ATTACHMENT ONE

Radiological Work Permits (RWPs)

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## ATTACHMENT TWO ALARA Review Plans